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Marshall Space Flight Center



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Guidelines for Fabrication of Hybrid Microcircuits

The document on Guidelines for Fabrication of Hybrid Microcircuits is a summary of the approaches that may be taken in designing hybrid microcircuits similar to those used for application in an aerospace program. The handbook was intended primarily for use by electronic-circuits engineers on the Space Shuttle Program as a guide in selection of microcircuits. The very nature of hybrid microcircuits and the history of their development and manufacture by any one company lead naturally to a number of design approaches. Those applicable to modern high-reliability electronics are examined and evaluated. It has been recognized that it is neither economical nor practical to prescribe one set of design approaches, even for one of the many classes of hybrids, since in many cases there are trade-offs yielding no distinct differences in the all-important reliability area. Nevertheless, important differences do occur in some functions and in the manner in which process steps are controlled. It is intended that sufficient distinction has been made in these areas to permit use of these guidelines for at least an initial reliability assessment of hybrid microcircuits.

Description is made of latest good practice for reliability in hybrids, and layout and design from the electronic, geometric, mechanical, and thermal points of view are covered in some detail. Packages are discussed with regard to layout and design, integrity, and the next level of system interconnection. Parts selection, evaluation,

and procurement control are discussed. Extensive coverage is provided on materials, processes, and assembly methods, arranged primarily by function, with considerable attention to in-process controls likely to affect reliability. Finally, attention is given to testing from the reliability demonstration point of view.

Notes:

1. Information concerning this innovation may be of interest to designers, manufacturers, and users of microcircuitry.
2. Requests for further information may be directed to:
Technology Utilization Officer
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No patent action is contemplated by NASA.

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